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EXAMINER	
WANG, QUAN ZHEN	
ART UNIT	**PAPER NUMBER**
2613	

DATE MAILED: 07/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/986,057	CHRISTOPHER, PAUL F.	
	Examiner	Art Unit	
	Quan-Zhen Wang	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-8,11-14,29-31 and 52-71* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1,4-8,11-14,29-31 and 52-71* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 15, 2006 has been entered.

Claim Rejections - 35 USC § 112

2. Claims 31, 63, 68, and 71 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 31, 63, 68, and 71 recite the limitation of "... expresses cloud water content as a function of an exceedance probability and said selected region's latitude and longitude" which was not supported by the original specification. Therefore, the cited limitation is considered as new matter.

3. Claims 53, 61, and 66 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably

convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 53, 61, and 66 recite the limitation of "said elliptical orbit is inclined at critical inclination" which was not supported by the original specification. Therefore, the cited limitation is considered as new matter.

4. Claims 56 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 53 recites the limitation of "said Molniya orbit is inclined at critical inclination" which was not supported by the original specification. Therefore, the cited limitation is considered as new matter.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 4, 7, 29, and 52-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) or Draim et al. (J. Draim et al., "Expanding global communications capacity using higher frequency bands with elliptical satellite constellations", 2000. IDS provided by Applicant).

Regarding claims 1 and 29, Mendenhall teaches a satellite communication system comprising: a terrestrial base station (fig. 1B, 26); and a first satellite (fig. 1B, 10) communicating with said terrestrial base station using an infrared signal (optical beam, column 6, lines 63-64). Mendenhall further discloses that the satellite is an earth-orbiting satellite, which is inherently in inclined elliptical orbit, and is configured having an apogee at zenith for the terrestrial base station (as shown in fig. 1B). Mendenhall differs from the claimed invention in that Mendenhall does not specifically teach that an optimal location of the terrestrial base station is determined based on a wavelength of the infrared signal and an attenuation of the infrared signal between the base station and the satellite at the wavelength, and the attenuation is determined based on a cloud water content for communication at zenith, persisting in a region in which the terrestrial base station is located. However, it is well known in the art that the attenuation of the non rainy atmosphere is the dominating factor for ground-to-space optical satellite communication systems. For example, Badesha discloses that clouds, rain, and fog can scatter optical beam energy and disrupt communications (page 1, paragraph 0005, lines 8-10). Badesha further discloses that one approach to mitigate the problem is to have several ground stations at different locations so that a transmission can be sent from the ground station that is least obstructed (optimal location) by clouds (page 1, paragraph 0006). Likewise, Draim discloses to select an optimal location for the terrestrial station to minimize the attenuation of the optical signals (the entire article). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to select an optimal location of

the terrestrial base station based on the minimal attenuation of the optical signals, which is a function of the wavelength of the infrared signal and the cloud water content for communication at zenith, persisting in a region in which the terrestrial base station is located, in order to provide a reliable communication capability.

Regarding claim 4, a terrestrial base station on the earth is inherently defined by longitude and latitude.

Regarding claim 7, since the attenuation is proportional to the distance of optical signal propagating in the atmosphere, the attenuation is inherently determined by the probability function of an elevation angle to the satellite from the base station.

Regarding claim 52, it is obvious that the communicating occurs only when the satellite is in a portion of the elliptical orbit which is at or near the apogee.

Regarding claim 53, an elliptical orbit can be obviously at critical inclination.

7. Claims 5 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) and further in view of Pfeiffer et al. (U.S. Patent US 5,960,097).

Regarding claims 5 and 30, the modified system of Mendenhall and Badesha differs from the claimed invention in that Mendenhall and Badesha differ do not specifically teach to determine the cloud water content based on an exceedance probability. However, exceedance probability is well known in the art and is widely used to analyze random systems. For Example, Pfeiffer discloses to use exceedance

probability method to analyzing the influence of background clutter on a missile detection and tracking system (column 11, line 67 to column 12, line 2). The problem is analog to the signal degradation of the satellite communication system by water content in the clouds. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to apply the exceedance probability method taught by Pfeiffer to the modified system of Mendenhall and Badesha in order to analyze the influence of the clouds on the satellite signals.

8. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) and further in view of Chu et al. (The Bell System Technical Journal, May-June 1968 Volume 47, Number 5, Page 723-759; IDS provided by Applicant).

Regarding claim 6, the modified system of Mendenhall and Badesha differs from the claimed invention in that Mendenhall and Badesha do not specifically teach to determine the cloud water content based on cloud water content formula. However, it is well known in the art to determine the cloud water content based on cloud water content formula. For example, Chu et al. teach to use cloud water content formula (equations 9, and 12) to study the signal degradation caused by clouds. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to apply cloud water content formula to the modified system of Mendenhall and Badesha in order to analyze the influence of clouds on the satellite signals.

9. Claims 54 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) and further in view of Fletcher et al. (U.S. Patent US 4,025,783).

Regarding claims 54 and 58, the modified system of Mendenhall and Badesha differs from the claimed invention in that Mendenhall and Badesha do not specifically teach to determine the wavelength of the infrared signal is about 10 microns. However, it is well known in the art to use optical signals of about 10 microns wavelength for free space communications. For example, Fletcher discloses to use optical signals of about 10 microns wavelength for free space communications (column 1, lines 22-27). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to use 10 microns wavelength optical signal to carry information in the modified system of Mendenhall and Badesha in order to reduce the signal attenuation by clouds.

10. Claims 8, 11, 14, 55-56, 59-61, and 64-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) or Draim et al. (J. Draim et al., "Expanding global communications capacity using higher frequency bands with elliptical satellite constellations", 2000. IDS provided by Applicant) and further in view of Ross et al. (U.S. Patent US 5,218,467).

Regarding claims 8, 59, and 64, Mendenhall, Badesha, and Draim have been discussed above in regard with claims 1 and 29. Mendenhall and Badesha, or Mendenhall and Draim differ from the claimed invention in that Mendenhall and Badesha, or Mendenhall and Draim do not specifically disclose that the system further comprising a second satellite, a third satellite, a fourth satellite, and a fifth satellite, and the first satellite, second satellite, and third satellite each being in a phased Molniya orbit, and at least a fourth satellite and fifth satellite each being in a geosynchronous orbit. However, Ross discloses a satellite communication system have a geosynchronous satellite (fig. 1, 1) communicating with six Molniya orbit satellites. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to include more than one geosynchronous satellites and plurality of Molniya orbit satellites in the modified satellite communication system of Mendenhall and Badesha, or Mendenhall and Draim in order to increase the area that the satellite communication system covers.

Regarding claim 11, a terrestrial base station on the earth is inherently defined by longitude and latitude.

Regarding claim 14, since the attenuation is proportional to the distance of optical signal propagating in the atmosphere, the attenuation is inherently determined by the probability function of an elevation angle to the satellite from the base station.

Regarding claim 55, it is obvious that the communicating occurs only when the satellite is in a portion of the Molniya orbit which is at or near the apogee.

Regarding claim 56, a Molniya orbit can be obvious at critical inclination.

Regarding claim 60 and 65, it is obvious that the communicating occurs only when the satellite is in a portion of the elliptical orbit which is at or near the apogee.

Regarding claim 61 and 66, an elliptical orbit can be obvious at critical inclination.

11. Claim 69 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) or Draim et al. (J. Draim et al., "Expanding global communications capacity using higher frequency bands with elliptical satellite constellations", 2000. IDS provided by Applicant) and further in view of Colella (N. Colella et al., "The HALO network", IEEE Communications Magazine, June 2000, pages 142-148).

Regarding claim 69, Mendenhall, Badesha, and Draim have been discussed above in regard with claims 1 and 29. Mendenhall and Badesha, or Mendenhall and Draim differ from the claimed invention in that Mendenhall and Badesha, or Mendenhall and Draim do not specifically disclose that the system comprising aircraft flies at high altitude in a close path so as to be able to communicate continuously with the terrestrial base station. However, a communication system using a high altitude aircraft is well known in the art. For example, Colella discloses a communication network utilizing a high altitude aircraft (fig. 1). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to incorporate a high altitude aircraft to replace the satellite in the modified satellite communication system of

Mendenhall and Badesha, or Mendenhall and Draim in order to serve a metropolitan area with lower cost.

12. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) and Ross et al. (U.S. Patent US 5,218,467) and further in view of Pfeiffer et al. (U.S. Patent US 5,960,097).

Regarding claim 12, the modified system of Mendenhall, Badesha, and Ross differs from the claimed invention in that Mendenhall, Badesha, and Ross differ do not specifically teach to determine the cloud water content based on an exceedance probability. However, exceedance probability is well known in the art and is widely used to analyze random systems. For Example, Pfeiffer discloses to use exceedance probability method to analyzing the influence of background clutter on a missile detection and tracking system (column 11, line 67 to column 12, line 2). The problem is analog to the signal degradation of the satellite communication system by water content in the clouds. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to apply the exceedance probability method taught by Pfeiffer to the modified system of Mendenhall, Badesha, and Ross in order to analyze the influence of the clouds on the satellite signals.

13. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S.

Patent Application Publication US 2002/0167702 A1) and Ross et al. (U.S. Patent US 5,218,467) and further in view of Chu et al. (The Bell System Technical Journal, May-June 1968 Volume 47, Number 5, Page 723-759; IDS provided by Applicant).

Regarding claim 13, the modified system of Mendenhall, Badesha, and Ross differs from the claimed invention in that Mendenhall, Badesha, and Ross do not specifically teach to determine the cloud water content based on cloud water content formula. However, it is well known in the art to determine the cloud water content based on cloud water content formula. For example, Chu et al. teach to use cloud water content formula (equations 9, and 12) to study the signal degradation caused by clouds. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to apply cloud water content formula to the modified system of Mendenhall, Badesha, and Ross in order to analyze the influence of clouds on the satellite signals.

14. Claims 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) and Pfeiffer et al. (U.S. Patent US 5,960,097) and further in view of Chu et al. (The Bell System Technical Journal, May-June 1968 Volume 47, Number 5, Page 723-759).

Regarding claim 31, the modified system of Mendenhall, Badesha, and Pfeiffer differs from the claimed invention in that Mendenhall, Badesha, and Pfeiffer do not specifically teach to determine the cloud water content based on cloud water content

formula. However, it is well known in the art to determine the cloud water content based on cloud water content formula. For example, Chu et al. teach to use cloud water content formula (equations 9, and 12) to study the signal degradation caused by clouds. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to apply cloud water content formula to the modified system of Mendenhall, Badesha, and Pfeiffer in order to analyze the influence of clouds on the satellite signals.

15. Claims 57, 62, and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) and Ross et al. (U.S. Patent US 5,218,467) and further in view of Fletcher et al. (U.S. Patent US 4,025,783).

Regarding claim 57, 62, and 67, the modified system of Mendenhall, Badesha, and Ross differs from the claimed invention in that Mendenhall, Badesha, and Ross do not specifically teach to determine the wavelength of the infrared signal is about 10 microns. However, it is well known in the art to use optical signals of about 10 microns wavelength for free space communications. For example, Fletcher discloses to use optical signals of about 10 microns wavelength for free space communications (column 1, lines 22-27). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to use 10 microns wavelength optical signal to

carry information in the modified system of Mendenhall, Badesha, and Ross in order to reduce the signal attenuation by clouds.

16. Claims 63 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) and Ross et al. (U.S. Patent US 5,218,467) and further in view of Chu et al. (The Bell System Technical Journal, May-June 1968 Volume 47, Number 5, Page 723-759; IDS provided by Applicant).

Regarding claims 63 and 68, the modified system of Mendenhall, Badesha, and Ross differs from the claimed invention in that Mendenhall, Badesha, and Ross do not specifically teach to determine the cloud water content based on cloud water content formula. However, it is well known in the art to determine the cloud water content based on cloud water content formula. For example, Chu et al. teach to use cloud water content formula (equations 9, and 12) to study the signal degradation caused by clouds. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to apply cloud water content formula to the modified system of Mendenhall, Badesha, and Ross in order to analyze the influence of clouds on the satellite signals.

17. Claim 70 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) and Colella (N. Colella et al., "The

HALO network", IEEE Communications Magazine, June 2000, pages 142-148) and further in view of Fletcher et al. (U.S. Patent US 4,025,783).

Regarding claim 70, the modified system of Mendenhall, Badesha, and Colella differs from the claimed invention in that Mendenhall, Badesha, and Colella do not specifically teach to determine the wavelength of the infrared signal is about 10 microns. However, it is well known in the art to use optical signals of about 10 microns wavelength for free space communications. For example, Fletcher discloses to use optical signals of about 10 microns wavelength for free space communications (column 1, lines 22-27). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to use 10 microns wavelength optical signal to carry information in the modified system of Mendenhall, Badesha, and Colella in order to reduce the signal attenuation by clouds.

18. Claim 71 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mendenhall et al. (U.S. Patent US 6,535,314 A1 B1) in view of Badesha et al. (U.S. Patent Application Publication US 2002/0167702 A1) and Colella (N. Colella et al., "The HALO network", IEEE Communications Magazine, June 2000, pages 142-148) and further in view of Chu et al. (The Bell System Technical Journal, May-June 1968 Volume 47, Number 5, Page 723-759; IDS provided by Applicant).

Regarding claim 71, the modified system of Mendenhall, Badesha, and Colella differs from the claimed invention in that Mendenhall, Badesha, and Colella do not specifically teach to determine the cloud water content based on cloud water content

formula. However, it is well known in the art to determine the cloud water content based on cloud water content formula. For example, Chu et al. teach to use cloud water content formula (equations 9, and 12) to study the signal degradation caused by clouds. Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to apply cloud water content formula to the modified system of Mendenhall, Badesha, and Colella in order to analyze the influence of clouds on the satellite signals.

Response to Arguments

19. Applicant's arguments filed on May 15, 2006 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wilson et al. (K. Wilson et al., "Optical communications for deep space missions", IEEE communication Magazine, August 2000, IDS provided by Applicant) discloses an optical communication system for deep space communications.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quan-Zhen Wang whose telephone number is (571)

272-3114. The examiner can normally be reached on 9:00 AM - 5:00 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

qzw
6/28/2006

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